TM 11-6660-200-20

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

WIND MEASURING SET AN/GMQ-11

ORGANIZATIONAL MAINTENANCE

HEADQUARTERS, DEPARTMENT OF THE ARMY

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WIND MEASURING SET AN/GMQ-11

			Paragraph	Page
CHAPTER	1.	INTRODUCTION		
		Scope	1	2
		Differences in models	2	2
	2.	INSTALLATION		
Section	I.	Service upon receipt of equipment.		
		Unpacking	3	4
		Checking unpacked wind measuring set	4	4
	II.	Siting and installing wind measuring set.		
		Siting	5	7
		Tools and materials required for installation	6	7
		Installation of support	7	9
		Protective ground connection	8	11
		Installation and alinement of connector housing	9	11
		Installation of interconnection cable	10	13
		Installation of transmitter	11	15
		Guying support	12	15
		Installation of indicator	13	17
		Adjusting indicator for wind speed in knots or miles per hour	14	17
		Zeroing wind speed indicator	15	18
		Interconnection of wind measuring set and auxiliary equipment	16	18
		Checking installed wind measuring set	17	20
CHAPTER	3.	MAINTENANCE INSTRUCTIONS		
Section	I.	General.		
		Scope of organizational maintenance	18	21
		Tools, materials, and test equipment required	19	21
	II.	Preventive maintenance.		
		Monthly maintenance	20	21
		Quarterly maintenance	21	21
		Cleaning collector rings and collector-ring brushes	22	21
		Cleaning commutator and commutator brushes	23	23
Section	III.	Organizational troubleshooting.		
		General	24	23
		Troubleshooting checklist	25	24
		Organizational repair of transmitter	26	24
		Organizational repair of indicator	27	24
		Transmitter friction tests	28	25
CHAPTER	4.	THEORY		
		General	29	29
		Wind speed circuit	30	29
		Wind direction circuit	31	29
		Dial illumination circuit	32	29
	5.	SHIPMENT AND LIMITED STORAGE		
		Disassembly	33	30
		Repackaging for shipment or limited storage	34	30

* This manual supersedes so much of TM 11-2443, 14 December 1954, including C 1, 15 November 1955, C 2, 7 February 1956, C 3, 7 May 1956, and C 4, 3 January 1958, as pertains to installation and organizational maintenance of the wind measur-

CHAPTER 1
INTRODUCTION

1. Scope

a. This manual covers organizational maintenance of Wind Measuring Set AN/GMQ–11. The operating instructions for this equipment are contained in TM 11–6660–200–10, Wind Measuring Set AN/GMQ–11, Operator's Manual.

b. Refer to TM 11–2444, Wind Direction and Speed Recorders RO–2/GMQ, RO–2A/GMQ, and RO–2B/GMQ, when recorder is used with wind measuring set.

c. See SIG 7&8 AN/GMQ–11, Wind Measuring Set AN/GMQ–11, for maintenance parts information.

d. For applicable forms and records, see paragraph 2, TM 11–6660–200–10.

e. Forward comments concerning this manual to the Commanding Officer, U. S. Army Signal Publications Agency, Fort Monmouth, N. J.

2. Differences in Models

All differences of significance to organizational maintenance personnel are listed in the charts below.

a. Transmitter.

Item	T–420/GMQ–11	T–420A/GMQ–11
Components		
$\frac{3}{32}$-in. Allen wrench	Not included	1 included.
No. 6 Bristol wrench	1 included	Not included.
No. 10 Bristol wrench	1 included	Not included.
Connector-housing cover	Cover not permanently attached to connector housing (28, fig. 7).	Cover hinged to connector housing (25, fig. 7).
Connector-housing alinement	Compass and straight edge used (par. 9*b* (1)).	Compass and alinement holes in connector-housing shaft used for initial alinement; compass and straight edge used for realinement (par. 9*b*) (2)).

b. Support.

Item	MT–1246/GMQ–11	MT–1246A/GMQ–11
Method of securing upper mast section to lower mast section	Mast clamps and adapters used (10 and 12, fig. 3).	Rubber bushing and compression nut used (9 and 10, fig. 5).
Method of securing transmitter connector housing to upper mast section of support.	Three instrument clamps used (6, fig. 3); top of upper mast section slotted.	Securing screw used (fig. 6); connector-housing shaft slotted.
Method of attaching guys to support	Guys looped around support at point above instrument clamps (fig. 4).	Guys looped through eyelets at top of lower mast section (fig. 6).
Support mounting radius	Fixed at 24 inches	Adjustable from 24 to 27 inches.

c. Indicator.

Item	ID–373/GMQ–11	ID–373A/GMQ–11
Power connection arrangement	Power cable wired to TB201 during manufacture.	Power cable equipped with receptacle connector which is connected during installation to plug connector on rear of indicator.
Equipment interconnection arrangement	Leads of interconnection cable attached to TB201 during installation.	Plug connector supplied for indicator end of interconnection cable. Plug connector connected to receptacle connector on rear of indicator during installation. Additional plug connector and receptacle connector furnished for connection of a recorder or a second indicator.
Wire coding system	Wires are white with identification numbers printed on outer jacket, except those indicators bearing Order No. 21513–P–57, which are color coded.	Wires color coded.
Wind speed indicator zero adjustment feature.	Disassembly required for zero adjustment (par. 15*b*).	Disassembly not required for zero adjustment (par. 15*b*).

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

3. Unpacking

a. Packaging Data. When packaged for shipment, the components of the wind measuring set are placed in fiberboard cartons and packed in two wooden boxes (figs. 1 and 2). The chart below lists the approximate dimensions, volume, and weight of each packed box.

Box No.	Dimensions (in.)	Volume (cu ft)	Weight (lb)	Contents of box
1	39½ x 20¾ x 16⅝	8.8	91	Transmitter, indicator, and literature.
2	9½ x 10½ x 78½	4	77	Support.

b. Removing Contents. Unpack the wooden boxes as follows:

(1) Cut and fold back the metal straps.

(2) Remove the top of each box.

***Caution:* Remove the tops carefully to prevent damage to the contents.**

(3) Remove the literature envelope and three fiberboard cartons from box No. 1. Open each fiberboard carton and remove the equipment items.

(4) Remove the packaged support from box No. 2 and remove the support from its wrapping. Remove the steel strap from the support.

4. Checking Unpacked Wind Measuring Set

a. Check the contents of the boxes against the packing lists. If the packing lists are not available, refer to the table of components in TM 11–6660–200–10.

b. Inspect all items carefully for damage.

c. If the set is not complete, or if items are damaged, refer to paragraph 2, TM 11–6660–200–10.

d. If the equipment has been used or reconditioned, check to see whether any of the nomenclatured components have been changed by a modification work order (MWO). If modified, the MWO number will appear on the component near the nomenclature plate.

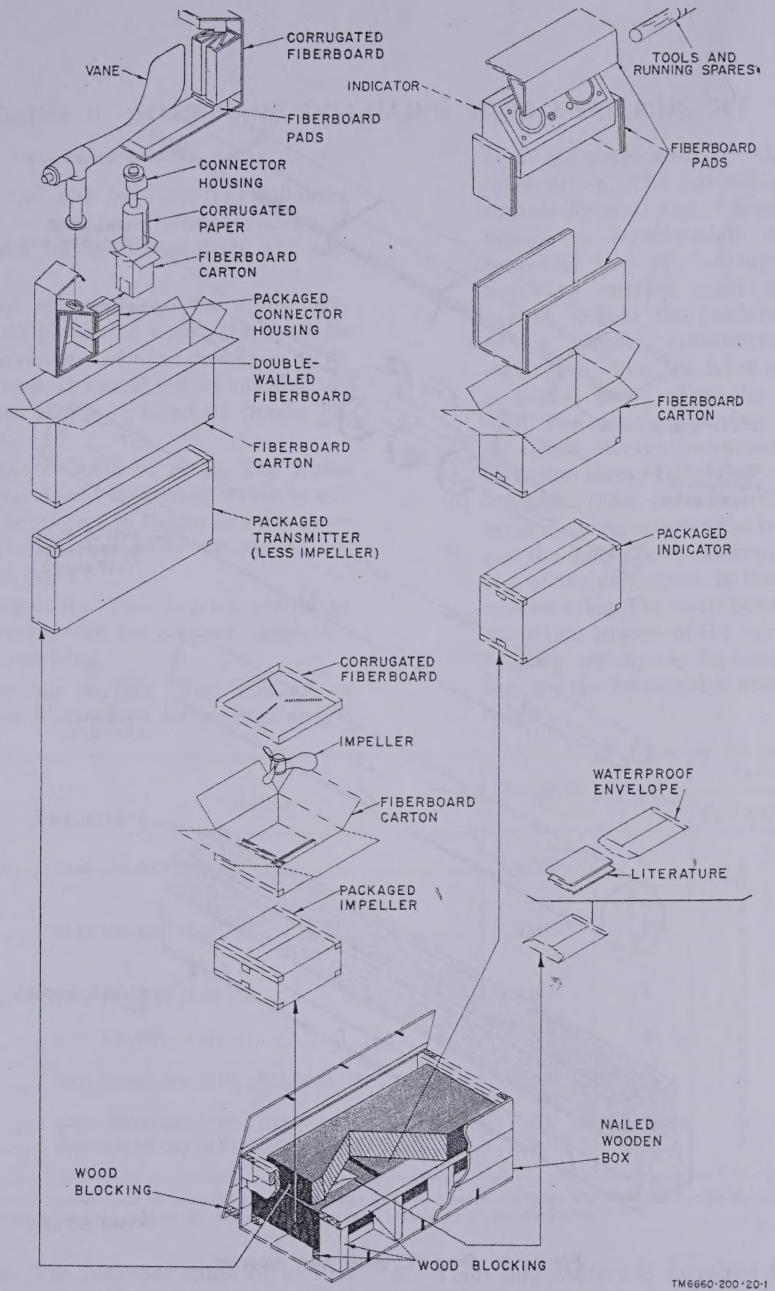


Figure 1. Transmitter, indicator, and literature, packaging diagram.

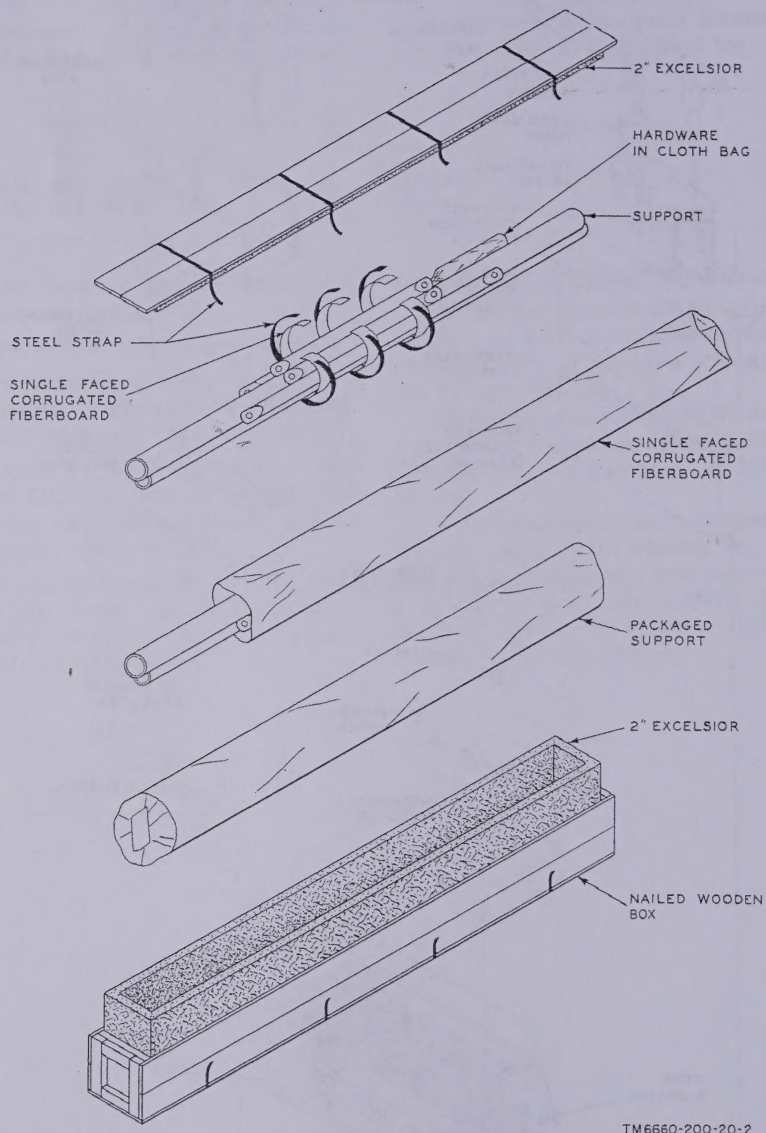


Figure 2. Support, packaging diagram.

Section II. SITING AND INSTALLING WIND MEASURING SET

5. Siting

a. Transmitter and Support. The following factors must be considered when selecting an installation site for the transmitter and support:

(1) *Wind obstructions.* The transmitter should be located where there will be an unobstructed wind flow from all directions. It should not be subjected to eddies of wind caused by nearby objects.

(2) *Smoke or exhaust gases.* The transmitter should be located where it will not be subject to smoke or gases from nearby smoke stacks or engine exhaust pipes.

(3) *Accessibility.* The location should be accessible for transmitter inspection and servicing.

(4) *Mounting surface.* The surface on which the support is mounted should be of concrete, wood, or other sturdy construction. The surface should be reasonably level and at least 4½ feet square to accommodate the three mounting feet of the support. The mounting surface must be strong enough to bear the combined weight of the support, transmitter, and a serviceman, plus the force applied by tightened guys, when the guys are used. The mounting surface also must be sturdy enough to support the installation under high-wind conditions.

(5) *Distance from indicator.* The maximum distance between the transmitter and the indicator is determined by the size of the conductors in the interconnection cable. The chart below lists the maximum lengths of the various types of cable which may be used to interconnect the transmitter and the indicator.

Cable*	Stock No.	Max length (ft)	Total conductors	Cond wire sizes	
				No. of cond	Size (AWG)
Cable WM–76/U	6145–284–0093 (Fed)	5,000	8	2	10
				3	14
				3	16
Cable CO–138	6145–160–4987 (Fed)	3,000	7	3	12
				2	16
				2	20
Cable CO–139	6145–160–0768 (Fed)	2,000	8	2	14
				6	20
Cable CO–120	6145–163–8888 (Fed)	500	8	2	16
				6	20
Cable CO–150	3300–322214–000 (AF), 3E2150 (Sig C)	300	8	4	16
				4	20
Cable	8860–428000–211 (AF), 1B3016–8.3 (Sig C)	300	8	8	16
Cable	8860–426000–211 (AF), 1B3020–6.1 (Sig C)	300	7	7	20

* Use Cable WM–76/U to interconnect the transmitter and the indicator whenever possible. If Cable WM–76/U is not available, use one of the substitutes listed in the chart below Cable WM–76/U. The substitutes are listed in the order of their desirability.

b. Indicator. The indicator must be located in a sheltered area within 6 feet of a source of 105- to 125-volt 60-cps alternating current (ac). It should be placed on a table or shelf where it can be read easily by the operator. Allow at least 6 inches of space on each side and at the rear for maintenance convenience.

6. Tools and Materials Required for Installation

a. Tools. All tools required for the installation of the wind measuring set are furnished as part of Tool Equipment TK–17/FMQ–1.

b. Materials. All materials required for installation are furnished with the wind measur-

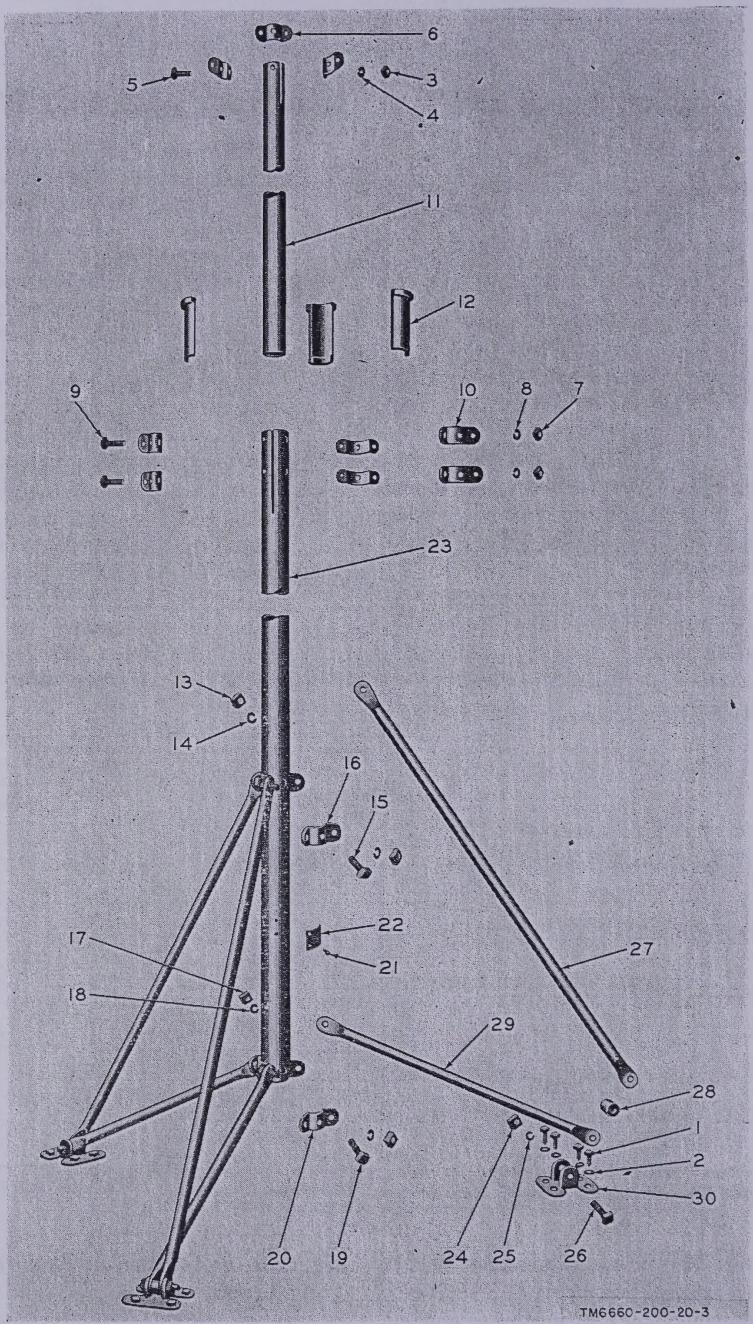


Figure 3. MT-1246/GMQ-11, assembly details.

1 Lag bolt H317
2 Washer H305
3 Nut H332
4 Lockwasher H329
5 Bolt H335
6 Instrument clamp A 306
7 Nut H359
8 Lockwasher H347
9 Bolt H371
10 Mast clamp A 312
11 Upper mast section A 301
12 Adapter A 309
13 Nut H365
14 Lockwasher H353
15 Bolt H377
16 Mast clamp A 318
17 Nut H368
18 Lockwasher H356
19 Bolt H380
20 Mast clamp A 321
21 Screw H301
22 Nameplate N301
23 Lower mast section A 302
24 Nut H341
25 Lockwasher H344
26 Bolt H338
27 Long brace A 303
28 Bushing A 330
29 Short brace A 324
30 Mast base A 327

Figure 3—Continued

ing set except the items listed in (1) through (7) below:

(1) Interconnection cable (chart, par. 5*a*(5)).

(2) Eight terminal lugs, FSN 5940–284–3283 (ID–373/GMQ–11 only).

(3) Ground rod, ½-inch diameter, 5 feet long (Fed stk No. 5975–240–3864), and clamp (Fed stk No. 5975–248–5814).

Note. The ground rod and clamp are required only when a suitable ground connection point is not available.

(4) Straightedge (metal or wood, 12-inch) (T–420/GMQ–11 only).

(5) Clamp, C-type, 3-inch opening (T–420/GMQ–11 only).

(6) Compass.

(7) Guying hardware (chart below).

Note. The guying hardware is required only when the support must be guyed to withstand hurricane-force winds.

Item	Stock No.	Quantity
Wire rope, 3/16-in.	4010–221–2703 (Fed)	45 ft for more, as required.
Cable clamp, 3/16 in.	4030–262–1873 (Fed)	6 ea
Eyebolt, 1/3- x 4-in.	5305–407–7929 (Fed)	3 ea
Hand nut ½-in. thd	5310–407–8136 (Fed)	3 ea
Guy stake*	7A1743–206/S1 (Sig C)	3 ea
Driving cap*	7A1743–206A/C1 (Sig C)	1 ea

* Required when support is installed at ground level, or when lower ends of guys are secured at ground level.

7. Installation of Support

a. MT–1246/GMQ–11.

(1) *Assembly* (fig. 3).

(*a*) Insert the bottom of the upper mast section (11) and the three adapters (12) into the top of the lower mast section (23). Clamp the upper mast section to the top of the lower mast section, using the six mast clamps (10), bolts (9), lockwashers (8), and nuts (7). Tighten the nuts and bolts until the upper mast section is held friction tight.

(*b*) Attach one end of each long brace (27) to the lower mast section, using the mast clamps (16), bolts (15), lockwashers (14), and nuts (13).

(*c*) Attach one end of each short brace (29) to the bottom of the lower mast section, using the mast clamps (20), bolts (19), lockwashers (18), and nuts (17).

(*d*) Attach the mast bases (30) to the lower ends of the long and the short braces, using the bushings (28), bolts (26), lockwashers (25), and nuts (24).

(*e*) Attach the three instrument clamps (6) to the top of the upper mast section using bolts (5), lockwashers (4), and nuts (3). Tighten the nuts and bolts finger-tight only.

(2) *Mounting* (fig. 4).

(*a*) Set the support on the mounting platform in the approximate position that it is to be mounted. Use a level, if available, or an improvised plumb line to be sure that the support is vertical. If out of plumb, place shims of the proper thickness under the mast bases until the support is vertical.

(*b*) Bolt the mast bases to the mounting platform, using the lag bolts (1) and washers (2) (Fig. 3). Recheck to be sure the support is not out of plumb.

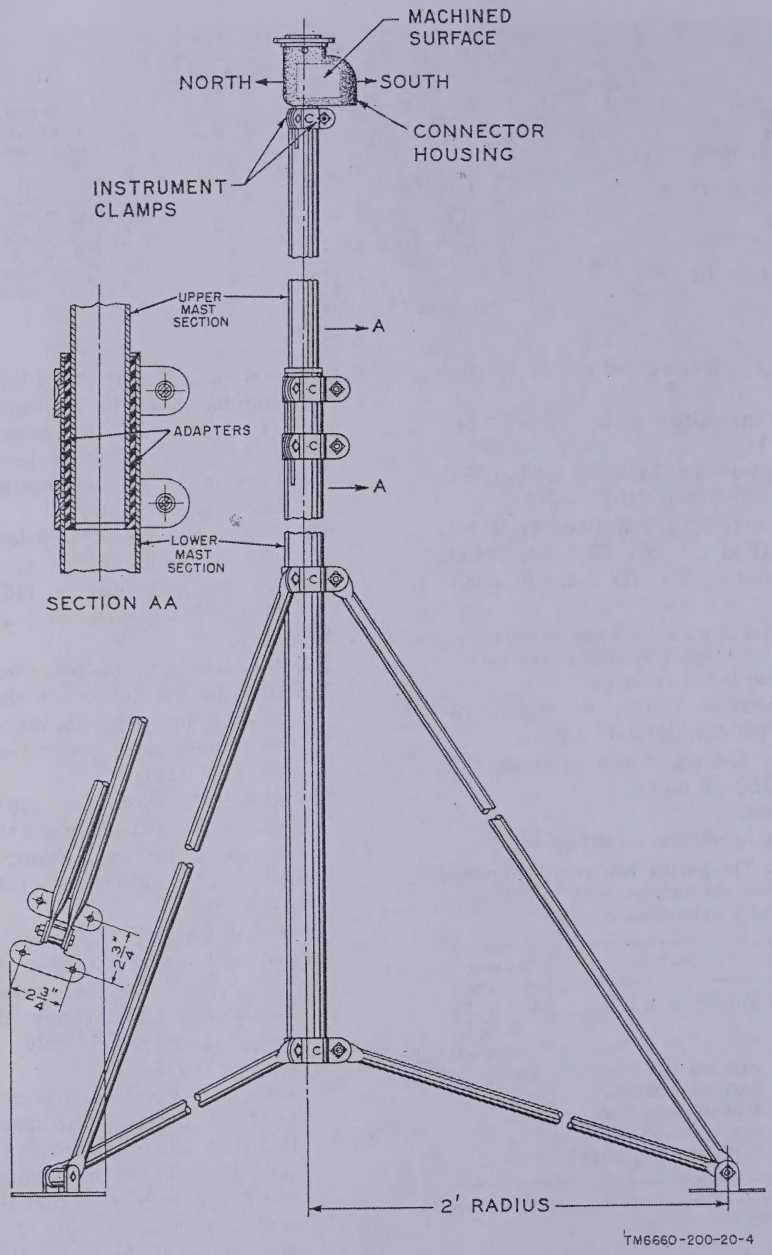


Figure 4. MT–1246/GMQ–11, mounting details.

(*c*) Tilt the support downward (*c* below) for installation of the transmitter.

b. MT–1246A/GMQ–11.

(1) *Assembly* (fig. 5).

(*a*) Insert the upper mast section (11) into the lower mast section (12). Slide the brass washer (8), rubber bushing (9), and compression nut (10) on the upper mast section. Tighten the compression nut (10) until the upper mast section is held friction tight in the lower mast section.

(*b*) Attach one end of each long brace and each short brace (13 and 14) to the lower mast section, using the mast clamps (15), bolts (3), lockwashers (19), and nuts (20).

(*c*) Attach the other end of each long brace and each short brace to the mast bases (16), using the bolts (6), bushings (7), lockwashers (4), and nuts (5).

(2) *Mounting* (fig. 6). Mount the support on the mounting surface (*a*(2) above).

c. Tilting Installed Support. After installation, the support can be tilted downward (horizontal position) for installation and maintenance of the transmitter. To tilt the support, remove the two bolts that secure two sets of braces to their associated mast bases. Use the bolt in the third mast base as a pivot point.

Caution: **Be sure to brace the support when it is tilted to the horizontal position, to prevent equipment damage. The braces will bend, and possibly break, if the support is not properly braced.**

d. Guying Support. If the possibility of hurricane-force winds makes the use of guys necessary, refer to paragraph 12 for guying information. Do not guy the support until the transmitter is installed (par. 11).

8. Protective Ground Connection

Connect one end of a wire (10-gage or larger) to one of the bolts that secures one of the mast bases to its braces. Attach the other end of the wire to a good ground connection point, such as a water pipe. If a good ground connection point is not available, drive a ground rod into the earth and connect the wire to the ground rod.

Caution: **If the water pipe of a metered system is used for the ground connection point, connect the ground wire to the input pipe of the meter. If this is not practical, connect the ground wire to any pipe on the output side of the meter and then connect a jumper wire (same size as the ground wire, or larger) between the input and output pipes, at the meter. Failure to observe this precaution may cause meter damage during electrical storms.**

9. Installation and Alinement of Connector Housing

a. Installation.

(1) *T–420/GMQ–11.*

(*a*) Insert the shaft of the connector housing into the top of the upper mast section (fig. 4).

(*b*) Tighten nuts (3, fig. 3) and bolts (5) to secure the connector housing to the upper mast section.

(2) *T–420A/GMQ–11.*

(*a*) Remove the securing screw (fig. 6) from the connector housing.

(*b*) Insert the shaft of the connector housing into the top of the upper mast section.

(*c*) Aline the threaded hole in the connector housing shaft with the hole in the upper mast section and screw the securing screw into the threaded hole. Tighten the screw until the connector housing is firmly secured to the upper mast section.

b. Alinement.

(1) *T–420/GMQ–11.*

(*a*) Clamp a straightedge to the machined side of the connector housing.

(*b*) Raise the support to the vertical position and secure all braces to their associated mast bases with the bolts, nuts, and bushings provided.

(*c*) If the wind direction is to be indicated with reference to true north (instead of magnetic north), refer to the station reference data for the local declination (angle between

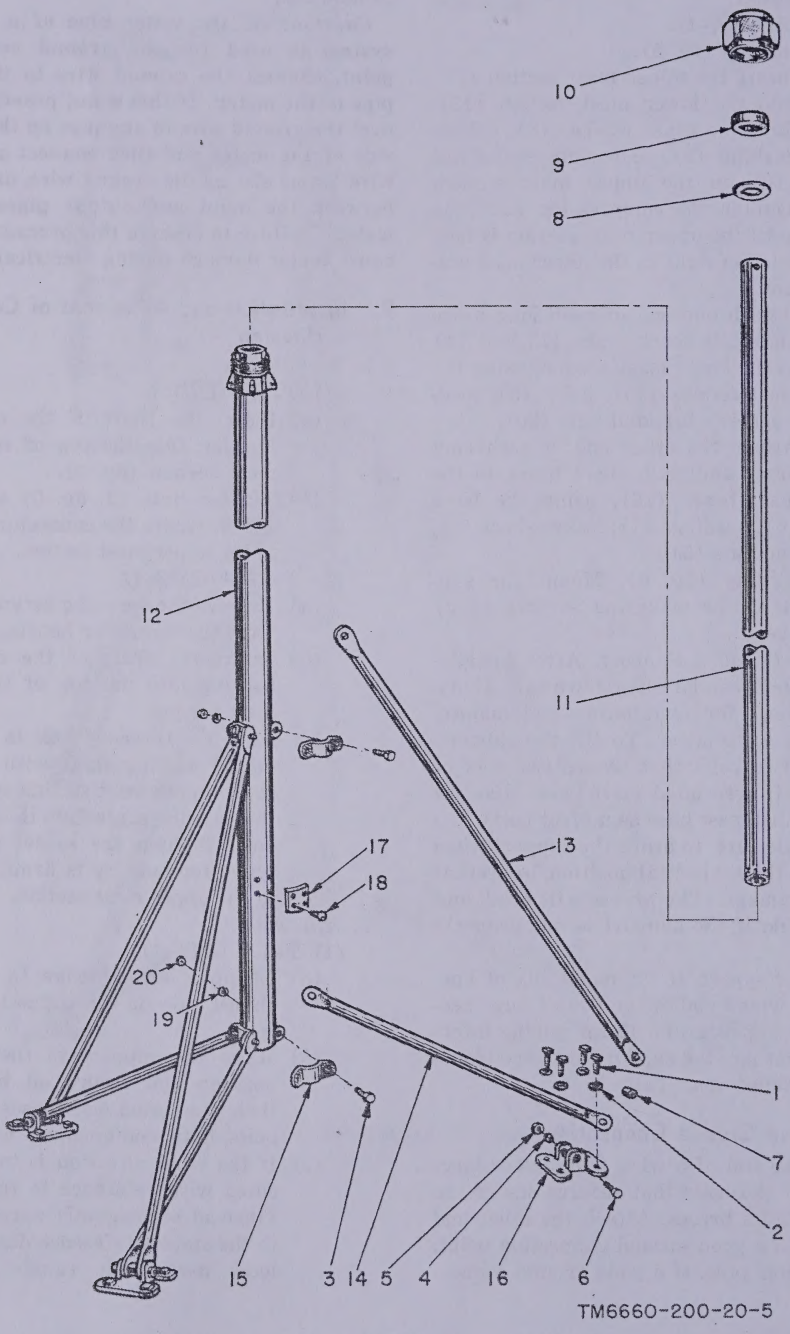


Figure 5. MT–1246A/GMQ–11, assembly details.

1 Lag bolt H317
2 Washer H305
3 Bolt H383
4 Lockwasher H344
5 Nut H384
6 Bolt H385
7 Bushing A 330
8 Brass washer A 401
9 Rubber bushing A 402
10 Compression nut A 403
11 Upper mast section A 301
12 Lower mast section A 302
13 Long brace A 303
14 Short brace A 324
15 Mast clamp A 318
16 Mast base A 327
17 Nameplate N401
18 Screw H301
19 Lockwasher H344
20 Nut H384

Figure 5—Continued

true north and magnetic north at a particular site).

(*d*) Turn the upper mast section until the straightedge is alined with either the true or magnetic north direction, as required, and the pipe plug on the underside of the connector housing is to the south side of the support. Tighten the nuts (7, fig. 3) and bolts (9) until the upper mast section is held securely to the lower mast section.

(*e*) Tilt the support downward (par. 7*c*) for installation of the transmitter.

(2) *T–420A/GMQ–11.*

(*a*) Perform steps (1)(*b*) and (*c*) above.

(*b*) Sight through the alinement holes in the shaft of the connector housing (fig. 6) and aline the holes with either the true or magnetic north direction, as required. Be sure the pipe plug on the underside of the connector housing is to the south side of the support. Tighten the compression nut to secure the upper mast section to the lower mast section.

(*c*) Tilt the support downward (par. 7*c*) for installation of the transmitter.

Note. After the interconnection cable is installed (par. 10), realinement of the connector housing of the T–420A/GMQ–11 requires the use of a clamp and a straightedge as described in (*1*) above.

10. Installation of Interconnection Cable

Either flexible cable or ¾-inch conduit may be used for interconnection of the transmitter and the indicator. If the installation is to be permanent, use conduit if it is available. One of the substitute cables (par. 5*a*(5)) must be used with conduit because the outer diameter of Cable WM–76/U is too large to fit through ¾-inch conduit.

a. Flexible-Cable Installation.

(1) Remove the screws (1, fig. 7) and lockwashers (2).

(*a*) Remove the connector-housing cover (28) and gasket (4) (T–420/GMQ–11 only).

(*b*) Tilt the hinged connector-housing cover (25) upward and remove gasket (4) (T–420A/GMQ–11 only).

(2) Remove the screws (6), lockwashers (7), and connector J1 (13) from the connector housing.

(3) If Cable WM–76/U is used, remove 12 inches of the outer jacket from the end of the cable and bare the ends of the conductors. If one of the substitute cables (par. 5*a*(5)) is used:

(*a*) Remove 4 inches of the outer jacket for connection to J1 of the T–420/GMQ–11.

(*b*) Remove 12 inches of the jacket for connection to J1 of the T–420A/GMQ–11.

(4) Insert the end of the interconnection cable into the bottom of the lower mast section and push it until the end protrudes through the opening in the top of the connector housing.

(5) Disassemble connector J1 (fig. 9) and solder the conductors of the interconnection cable to the proper terminals of J1 as indicated in the chart below. The conductor colors listed in the chart are the colors of the conductors in Cable WM–76/U. If a substitute cable is used, and the substitute cable contains several different-size conductors, use two of the largest conductors

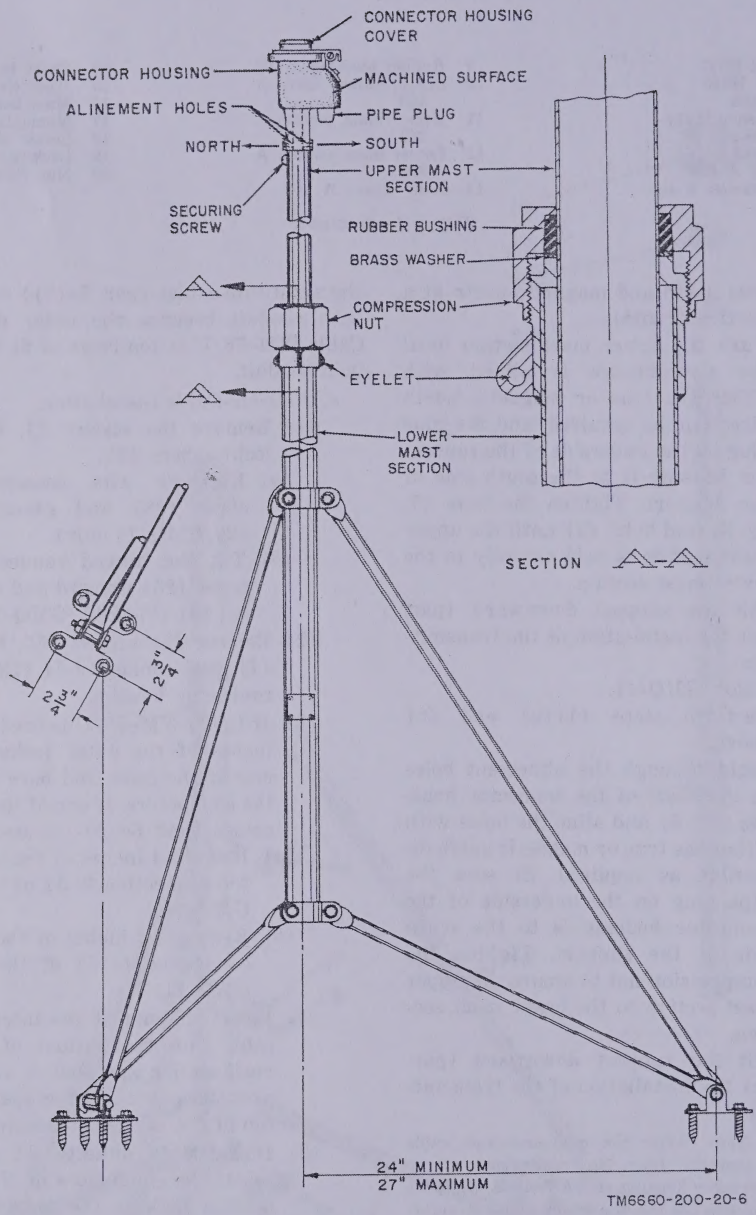


Figure 6. MT–1246A/GMQ–11, mounting details.

for the connections to terminals 6 and 7 of J1 (wind speed circuit terminals).

Note. Terminal 8 of J1 and the black conductor with white tracer of Cable WM–76/U are not used.

Color of conductors (Cable WM–76/U)	Transmitter terminals on J1	Indicator terminals on:		Conductor gage
		TB201 (ID–373 GMQ–11)	P402 and P403 (ID–373A/ GMQ–11)	
Blue	1	1	A	16
Red with black tracer.	2	2	B	16
Green	3	3	C	14
Red	4	4	D	14
Yellow	5	5	E	14
White	6	6	F	10
Black	7	7	G	10

(6) Assemble connector J1. If 12 inches of the outer jacket were removed ((3) above), wrap several layers of insulating tape around the conductors, approximately 3 inches from the bottom of J1. Attach the cable clamp (9, fig. 7) at the point where the tape is wrapped. If a substitute cable is used, attach the cable clamp approximately one-half inch from the end of the outer cable jacket.

(7) Insert connector J1 into the connector housing until the top of J1 protrudes ¼ inch from the top of the connector housing. Check to be sure there is some slack in the conductors between J1 and the cable clamp when the clamp is against the bottom of the connector housing. Reposition the cable clamp if necessary. Adjust the position of J1 until terminal 2 of J1 is adjacent to the positioning hole (21) in the connector housing. Secure J1 to the connector housing with screws (6) and lockwashers (7).

b. Conduit Installation.

(1) Remove the pipe plug (5, fig. 7) from the connector housing.

(2) Remove the screws (6), lockwashers (7), and connector J1 (13) from the connector housing.

(3) Remove 4 inches of the outer jacket of the cable and bare the ends of the conductors.

(4) Attach the vertical section of the conduit to the connector housing. Fasten the conduit to the support with suitable clamps.

(5) Insert the end of the interconnection cable into the bottom of the vertical section of the conduit. Push the cable through the conduit until the end protrudes through the opening in the connector housing.

(6) Peform *a*(5) through (7) above.

11. Installation of Transmitter

a. Remove the nose cap from the impeller and mount the impeller on the vane. Fasten the impeller to the vane with the three screws and lockwashers provided. Press the nose cap on the impeller.

***Caution:* Handle the assembled transmitter very carefully. Do not grasp the impeller or the vane tail when lifting the transmitter; hold the center section.**

b. Place the gasket (4, fig. 7) on the connector housing and aline the holes in the gasket with the holes in the connector housing.

c. Aline the positioning pin (20) in the vertical support with the positioning hole (21) in the connector housing. Press the transmitter downward until the pins of the plug in the vertical support fully engage connector J1 in the connector housing and the base of the vertical support seats firmly on the gasket. Secure the transmitter to the connector housing with the screws (1) and lockwashers (2).

d. Check the impeller and vane for excessive friction (par. 28).

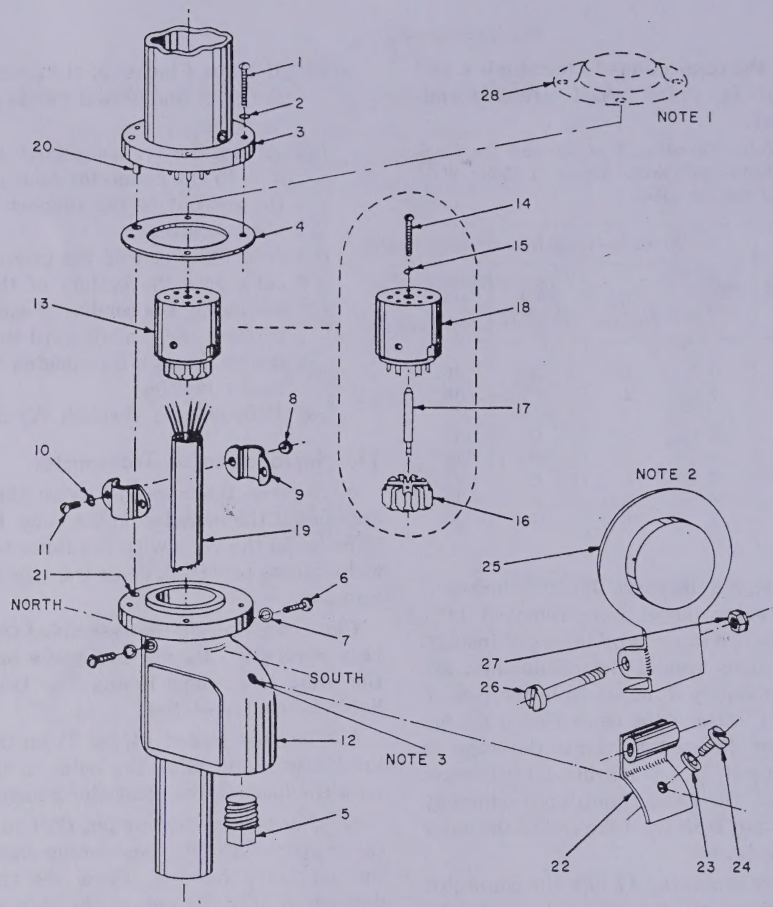
e. Raise the support to the vertical position and secure all braces to their associated mast bases with bolts and bushings.

f. Guy the support, if necessary (par. 12).

12. Guying Support

Guy the support if there is a possibility that the wind measuring set will be subjected to hurricane-force winds.

a. Use cable clamps to attach three guys to the top of the support.



NOTES:

1. PART OF T-420/GMQ-11 ONLY.
2. PART OF T-420A/GMQ-11 ONLY.
3. TAPPED HOLE NOT ON T-420/GMQ-11.

TM6660-200-20-7

1 Screw H9
2 Lockwasher H13
3 Vertical support A 6
4 Gasket O 4
5 Pipe plug H85
6 Screw H35
7 Lockwasher H59
8 Nut H55
9 Cable clamp O 14
10 Lockwasher H53
11 Screw H51
12 Connector housing A 3
13 Connector J1
14 Screw (part of J1)
15 Lockwasher (part of J1)
16 Retainer (part of J1)
17 Lug (part of J1)
18 Case (part of J1)
19 Interconnection cable
20 Positioning pin (part of A 6)
21 Positioning hole
22 Cover support A 410
23 Lockwasher H386
24 Screw H387
25 Connector-housing cover A 411 (T-420A/GMQ-11 only)
26 Screw H388
27 Nut H389
28 Connector-housing cover A 8 (T-420/GMQ-11 only)

Figure 7. Connector housing, exploded view.

(1) On the MT–1246/GMQ–11, loop the guys around the support, above the three instrument clamps (fig. 4).

(2) On the MT–1246A/GMQ–11, use the eyelets at the top of the lower mast section (fig. 6).

b. If the guys are to be secured at ground level, and the ground surface is approximately level, drive three guy stakes into the ground about 10 feet from the center of the support, on a line midway between each pair of support braces. When driving the guy stakes, tilt them away from the support. If the ground is not level, locate the guy stakes at points that will result in an equal angle of all guys (approx. 45°).

c. If the guys are not to be secured at ground level, fabricate three brackets which will accommodate ½-inch eyebolts. Use bolts or lag screws, as applicable, to secure the brackets to the mounting surfaces. Determine the location points of the brackets as described in *b* above.

d. Insert an eyebolt through the hole in each guy stake or bracket and screw a hand nut on the end of each eyebolt.

e. Loop the loose end of each guy through its associated eyebolt, take up slack as required, and secure each guy with a cable clamp.

f. Use the hand nuts to adjust the tension of each guy until the tensions are equal and the support is vertical.

13. Installation of Indicator

Note. If the wind measuring set is to be used with either an auxiliary recorder or a second indicator, refer to paragraph 16.

a. Preparation.

(1) Adjust the wind speed indicator to indicate wind speed in either knots or miles per hour as desired (par. 14).

(2) Zero the wind speed indicator (par. 15).

b. Cable Connections, ID–373/GMQ–11.

(1) *Interconnection cable.*

(*a*) Remove approximately 3 inches of the outer jacket from the end of the interconnection cable.

(*b*) Solder a terminal lug to each conductor of the cable.

(*c*) Connect the conductors to the terminals of TB201 (A, fig. 9).

Note. If the interconnection cable is Cable WM–76/U, refer to the chart in paragraph 10*a*(5) for conductor color data. If a substitute interconnection cable is used (par. 5), be sure that two of the largest size conductors in the cable are used to connect terminals 6 and 7 of J1 in the transmitter to terminals 6 and 7 of TB201 in the indicator (par. 10*a*(5)).

(2) *Power cable.* Connect the plug of the power cable to a source of 105- to 125-volt, 55- to 65-cycle-per-second (cps), single-phase ac.

c. Cable Connections ID–373A/GMQ–11 (B, fig. 9).

(1) *Interconnection cable.*

(*a*) Connect one of the two separately furnished plugs to the interconnection cable. Be sure to connect the conductor from terminal 1 of J1 in the transmitter to terminal A of the plug, terminal 2 of J1 to terminal B of the plug, etc.

(*b*) Plug the connector into J402 at the rear of the indicator (fig. 8).

(2) *Power cable.* Connect P401 of the power cable to J401 on the indicator (fig. 8). Connect the other end of the power cable to a source of 105- to 125-volt, 55- to 65-cps, single-phase ac.

14. Adjusting Indicator for Wind Speed in Knots or Miles Per Hour

a. Remove the rear panel from the indicator.

b. Connect the orange wire (white wire numbered 4–14 on some indicators) to terminal K on the rear of the wind speed indicator for indications in knots (fig. 8). Connect this wire to terminal M for indications in miles per hour.

c. If the indicator includes a plate mounted on the front panel below the wind speed indicator (fig. 3, TM 11–6660–200–10) and the lettering on the outer side of the plate does not agree with the wiring option selected (*b* above), remove the plate, turn it over, and replace it.

d. If the indicator includes a dial mask mounted behind the window of the wind speed indicator (fig. 1, TM 11–6660–200–10), and the lettering visible on the dial mask does not agree with the option selected, remove the screws that hold the wind speed indicator to the front panel

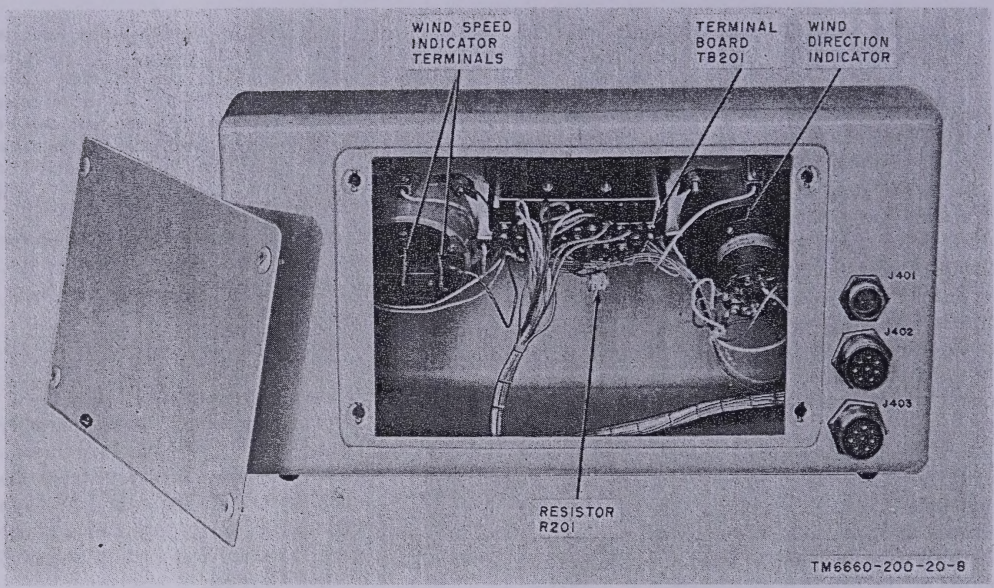


Figure 8. ID–373A/GMQ–11, rear view of interior.

and remove the wind speed indicator. Remove the dial window and mask from the indicator, turn the mask over, replace the mask and dial window, and fasten the indicator to the front panel.

e. Replace the rear panel.

15. Zeroing Wind Speed Indicator

a. Requirement. The pointer of the wind speed indicator should point to zero under either of the following conditions:

(1) Before interconnection of the indicator and transmitter.

(2) At any time that the impeller of the transmitter is motionless after interconnection of the indicator and transmitter.

b. Adjustment.

(1) *ID–373/GMQ–11.* Remove the wind speed indicator from the front panel and remove the dial window. Move the exposed zero adjustment lever to the right or left to meet the requirement. Reassemble and install the wind speed indicator.

(2) *ID–373A/GMQ–11.* Remove the zero adjustment access screw from the center of the wind speed indicator dial. Turn the exposed zero adjustment screw clockwise or counterclockwise to meet the requirement. Replace the zero adjustment access screw.

16. Interconnection of Wind Measuring Set and Auxiliary Equipment

If either a recorder or an additional indicator is to be used with the wind measuring set, install and interconnect the equipment as described below.

a. Wind Measuring Set and Auxiliary Indicator.

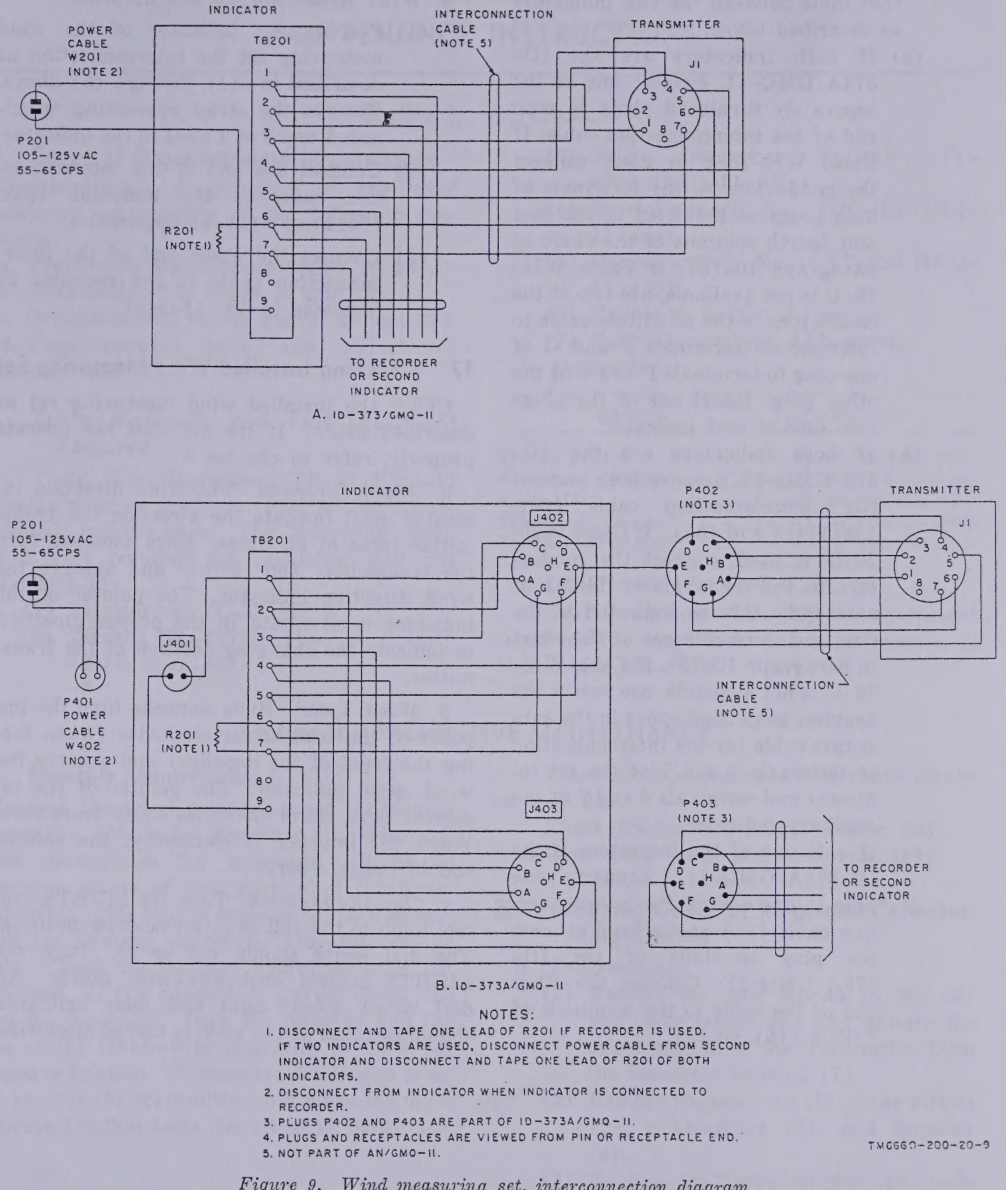
Note. If one of the two indicators to be interconnected is an ID–373A/GQM–11, use it as the *set* indicator when performing the installation procedures.

(1) Remove the rear panel of both indicators.

(2) Disconnect and tape one lead of R201 (fig. 8) of each indicator.

(3) If the auxiliary indicator is the ID–373/GMQ–11, disconnect the power cable leads from terminals 1 and 9 of TB201.

(4) If the auxiliary indicator is the ID–373A/GMQ–11, and the power cable



NOTES:

1. DISCONNECT AND TAPE ONE LEAD OF R201 IF RECORDER IS USED. IF TWO INDICATORS ARE USED, DISCONNECT POWER CABLE FROM SECOND INDICATOR AND DISCONNECT AND TAPE ONE LEAD OF R201 OF BOTH INDICATORS.
2. DISCONNECT FROM INDICATOR WHEN INDICATOR IS CONNECTED TO RECORDER.
3. PLUGS P402 AND P403 ARE PART OF ID-373A/GMQ-11.
4. PLUGS AND RECEPTACLES ARE VIEWED FROM PIN OR RECEPTACLE END.
5. NOT PART OF AN/GMQ-11.

TM6660-200-20-9

Figure 9. Wind measuring set, interconnection diagram.

is connected to J401 on the rear of the indicator, disconnect the power cable and screw the protective cap on J401.

(5) Adjust and zero both wind speed indicators (pars. 14 and 15).

(6) Prepare and connect an interconnection cable between the transmitter and the set indicator (par. 13*b*(1) or *c*(1) as applicable).

(7) Prepare and connect an interconnec-

tion cable between the two indicators as described below.

(*a*) If both indicators are the ID–373A/GMQ–11, connect one of the separately furnished plugs to each end of the interconnection cable. If Cable WM–76/U is used, connect the conductors to the terminals of both plugs as indicated in the first and fourth columns of the chart in paragraph 10*a*(5). If Cable WM–76/U is not available, use two of the conductors in the substitute cable to interconnect terminals F and G of one plug to terminals F and G of the other plug. Insert one of the plugs into J403 of each indicator.

(*b*) If both indicators are the ID–373/GMQ–11, prepare both ends of the interconnection cable (par. 13*b*(1)(*a*) and (*b*)). If Cable WM–76/U is used, connect the conductors to the terminals of TB201 of both indicators as indicated in the first and third columns of the chart in paragraph 10*a*(5). If Cable WM–76/U is not available, use two of the heaviest gage conductors in the substitute cable for the interconnection of terminals 6 and 7 of the set indicator and terminals 6 and 7 of the auxiliary indicator.

(*c*) If only one of the indicators is the ID–373A/GMQ–11, connect one plug to one end of the interconnection cable ((*a*) above) and connect the plug to J403 of the ID–373A/GMQ–11. Connect the other end of the cable to the terminals of TB201 ((*b*) above).

b. Wind Measuring Set and Recorder.

(1) Prepare the indicator of the wind measuring set for interconnection as described in *a*(1) through (5) above. Remove the strap connecting terminals 7 and 8 of TB201 in the indicator.

(2) Connect one end of the interconnection cable to the indicator (par. 13*b*(1) or *c*(1), as applicable).

(3) Connect the other end of the interconnection cable to the recorder as indicated in TM 11–2444.

17. Checking Installed Wind Measuring Set

Check the installed wind measuring set as described below. If the set does not operate properly, refer to chapter 3.

a. Wind Direction. The wind direction indicator must indicate the direction the transmitter faces at all times. Have someone turn the transmitter 360° slowly and observe the wind direction indicator. The pointer of the indicator must rotate in the proper direction to indicate the changing position of the transmitter.

b. Wind Speed. Have someone turn the impeller of the transmitter clockwise (when facing the front of the impeller) and observe the wind speed indicator. The pointer of the indicator must move clockwise away from zero. When the impeller is stationary, the pointer should indicate zero.

c. Dial Illumination. Turn the LIGHTS control knob to the full counterclockwise position. The dial lamps should not be lit. Turn the LIGHTS control knob clockwise slowly. All dial lamps should light and their brilliance should increase as the knob is turned clockwise.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. GENERAL

18. Scope of Organizational Maintenance

Organizational maintenance of the wind measuring set consists of the following procedures:

a. Preventive maintenance (pars. 20–23).

b. Troubleshooting (pars. 24 and 25).

c. Organizational repair (pars. 26 and 27).

d. Organizational tests and adjustment (pars. 15 and 28).

19. Tools, Materials, and Test Equipment Required

a. Tools. Tool Equipment TK–17/FQM–11 contains most of the tools required for organizational maintenance. The following additional tools required are furnished with the AN/GMQ–11:

(1) Screwdriver TL–358/U.

(2) Wrench TL–477/U (⅜- by 7/16-inch double open end).

(3) Allen wrench, 3/32-inch (T–420A/GMQ–11 only).

(4) Bristol wrench, No. 6 (T–420/GMQ–11 only).

(5) Bristol wrench, No. 10 (T–420/GMQ–11 only).

(6) Calibrator weight, 3.1 grams.

(7) Calibrator weight, 12.3 grams.

b. Materials.

Material	Stock number
Thinner TPM–1	Fed stk No. 8010–242–2089
Sandpaper, #0000	Ord stk No. 42–P–1154–10
Solder M31*	Fed stk No. 3432–269–9611
Tape TL–83 (friction)*	Fed stk No. 5970–184–2003
Tape TL–192 (rubber)*	Fed stk No. 5970–240–0611

* Part of Tool Equipment TK–17/FMQ–1.

c. Test Equipment. The only test equipment required for organizational maintenance is Multimeter ME–77/U.

Section II. PREVENTIVE MAINTENANCE

20. Monthly Maintenance

Inspect the wind measuring set thoroughly at monthly intervals. Examine all cables and cable connections for looseness. Check all clamping points of that portion of the interconnection cable that is exposed to the weather. Look for damage caused by vibration of the cable. Check the support mounting bolts for looseness. If the support is guyed, check the guys for looseness. Turn the impeller and the vane of the transmitter manually to check for excessive friction. If excessive friction is present, remove the transmitter and make the more accurate friction tests described in paragraph 28.

21. Quarterly Maintenance

Perform the maintenance procedures listed below at quarterly intervals.

a. Clean collector rings and collector-ring brushes (par. 22).

b. Clean commutator and commutator brushes (par. 23).

c. Check transmitter friction (par. 28).

d. Zero wind speed indicator (par. 15).

22. Cleaning Collector Rings and Collector-Ring Brushes

a. Disassembly.

(1) Remove the four screws (5, fig. 10) and lockwashers (6) and remove the upper section of the transmitter from the connector housing (7).

(2) Remove the nose cap (1), three screws (2), lockwashers (3), and impeller (4).

(3) Remove the three screws (9), lockwashers (10), shield (11), and generator cover (12).

(4) Remove the two nuts (14), lockwashers (15), and washers (16) and remove the vane tail (19) and gen-

erator (17) from the center-section assembly (23). Catch the gaskets (18 and 20) as they fall free.

Caution: **Do not turn the generator when removing it. Turning the generator will result in damage to the collector-ring brush assembly (25).**

(5) Remove the two screws (21), lockwashers (22), and center section (23).

b. Cleaning.

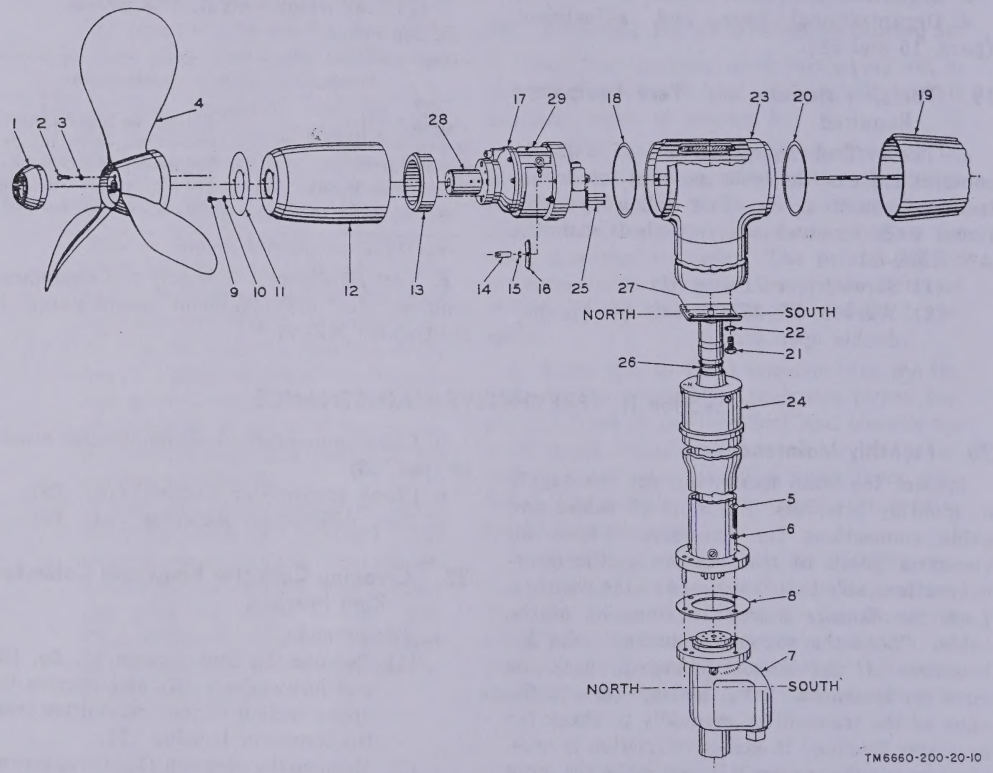
(1) Use a cloth dampened with Thinner TPM–1 to remove dirt and gummy deposits from the collector rings and collector-ring brushes.

(2) Use sandpaper (#0000 or finer) to remove corrosion from the collector rings and collector-ring brushes.

(3) Replace the collector-ring brush assembly (25) if either brush is badly pitted.

Note. Before reassembling the transmitter, check the condition of the commutator and commutator brush assembly (par. 23).

c. Reassembly. Reverse the disassembly procedure (*a* above) to reassemble the transmitter.



1 Nose cap O 13
2 Screw H39
3 Lockwasher H32
4 Impeller O 12
5 Screw H9
6 Lockwasher H13
7 Connector housing A 3
8 Gasket O 4
9 Screw H45
10 Lockwasher H48
11 Shield A 7
12 Generator cover A 5
13 Counterweight O 11
14 Nut O 6
15 Lockwasher H21
16 Washer O 9
17 Speed mechanism E1
18 Gasket O 5
19 Vane tail A 1
20 Gasket O 1
21 Cap screw H1
22 Lockwasher H3
23 Center-section assembly A 2
24 Support assembly A 6
25 Collector-ring brush assembly E4
26 Collector ring E11
27 Positioning hole
28 Hub O 25
29 Generator cover plate

Figure 10. Transmitter, exploded view.

23. Cleaning Commutator and Commutator Brushes

a. Preparation.

(1) Remove the generator and vane tail (par. 22*a*(1) through (4)).

(2) Remove the screws and lockwashers that fasten the generator cover plate (29, fig. 10) to the generator.

(3) Loosen the two screws on top of the commutator brush assembly and detach the connector straps (fig. 11).

(4) Lift the retaining pin, remove the screw pin and washer, and lift the commutator brush assembly from the generator.

b. Cleaning.

(1) Use a cloth dampened with thinner TPM–1 to remove dirt and gummy deposits from the commutator brush assembly.

(2) Use sandpaper (#0000 or finer) to remove corrosion from the commutator brushes. Replace the brushes if they are badly pitted.

(3) Dip an orange stick or a similar piece of pointed wood into thinner TPM–1, allow most of the fluid to drip from the stick, and use the moistened stick to remove deposits of foreign matter from the slots between the commutator segments.

c. Reassembly. Reverse the disassembly procedure (*a* above) to reassemble the transmitter. When installing the commutator brush assembly, be sure the red dot on the brush assembly is adjacent to the red dot on the generator case. When the screw pin is seated, the brush assembly must be free to rock.

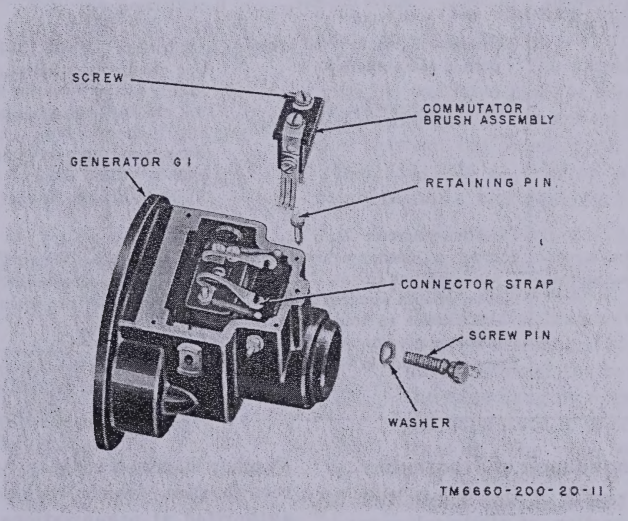


Figure 11. Commutator brush assembly, removal details.

Section III. ORGANIZATIONAL TROUBLESHOOTING

24. General

When the wind measuring set fails to operate properly, use the troubleshooting checklist (par. 25) as an aid to isolate troubles to a specific part or connection. Only those corrective actions authorized for the organizational maintenance level are listed. If the corrective action listed does not restore normal operation, higher level maintenance is required.

25. Troubleshooting Checklist

Symptom	Probable cause	Corrective action
Dial lamps do not light and wind direction indicator does not function; wind speed indicator operates normally.	Loss of input power	Remove plug P201 from receptacle of power source and check for 105- to 125-volt ac at receptacle. If no voltage is present, take appropriate action to restore external power. If voltage is present, insert P201 into power receptacle.
		Check fuse F201. Replace defective fuse with good .5-ampere fuse.
		Check connection of P401 and J401 on ID–373A/GMQ–11. Tighten connection if loose.
		Check continuity of dial illumination and wind direction circuits (figs. 13 and 15). Replace defective rheostat R202, transformer T201, fuse holder XF201, lamp holders XI201 through XI207, or power cable, as necessary.
Dial lamps do not light; all other operations normal.	Open in dial illumination circuit	Check continuity of dial illumination circuit (fig. 15). Solder or tighten loose connections, as applicable. Replace defective components.
Wind speed and wind direction indications erroneous or erratic.	Faulty interconnection of transmitter and indicator.	Check connection of P402 and J402 on ID–373A/GMQ–11. Check tightness of cable connections to TB201 of ID–373/GMQ–11. Correct defective connection. Check full length of interconnection cable for damage. Repair or replace, as necessary.
Wind speed indications erroneous, all other operations normal.	Broken or defective impeller	Replace impeller.
	Excessive friction in wind speed portion of transmitter.	Check friction (par. 28). If friction is caused by rubbing of adjacent surfaces, correct if possible. Replace generator if bearing friction is excessive.
	Open in wind speed circuit	Check continuity of wind-speed circuit (figs. 13 and 15). If circuit is open but fault is not in wiring or connections, check collector rings, commutator, and brushes. Clean collector rings, commutator, and brushes. Replace brushes, as necessary (pars. 22 and 23).
	Defective generator G1	Replace generator G1.
Wind-direction indications erroneous, all other operations normal.	Shorted or open conductors in wind-direction circuit.	Check continuity of conductors in wind-direction circuit. Tighten loose connections.
	Shorted or open windings or excessive friction in transmitter or indicator synchro.	Higher level maintenance required.
	Excessive friction in vane shaft	Check vane-shaft friction (par. 28). If friction is excessive, higher level maintenance is required.

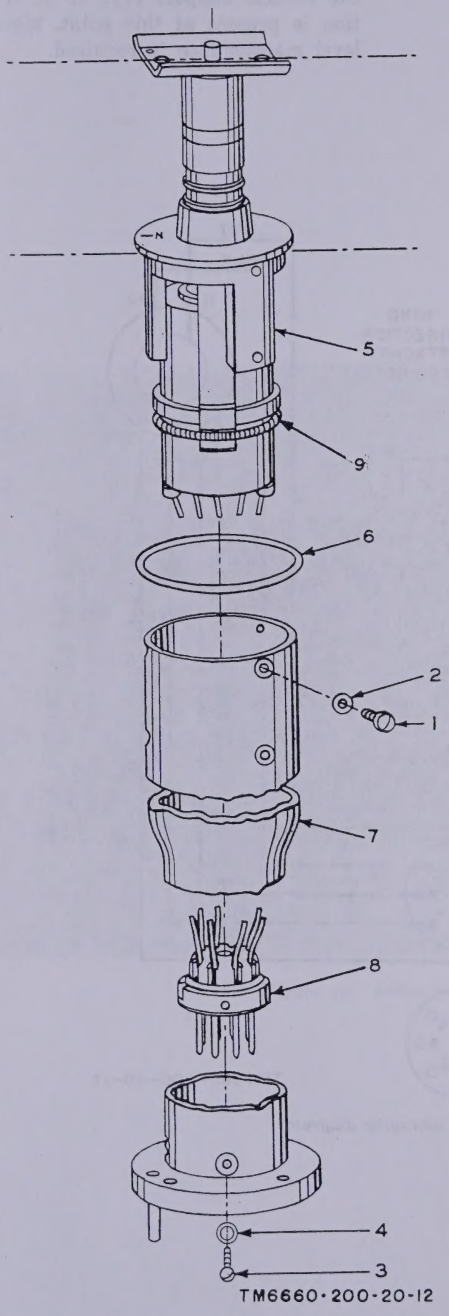
26. Organizational Repair of Transmitter

Organizational repair of the transmitter is limited to the correction of electrical connection faults and the replacement of only those parts authorized the using organization. Refer to figure 13 for circuit connection details of the transmitter. Refer to figures 10, 11, and 12 for disassembly and reassembly details. These illustrations indicate the extent of disassembly authorized for organizational repair.

Caution: **Do not disassemble the generator beyond the point illustrated in figure 11. Further disassembly results in the need for recalibration which requires equipment not authorized at organizational level.**

27. Organizational Repair of Indicator

Organizational repair of the indicator is limited to the correction of electrical connection faults and the replacement of only those parts authorized the using organization. Refer to figure 14 for information on the location of indicator components and to figure 15 for circuit details.



1 Screw H23
2 Lockwasher H29
3 Screw H35
4 Lockwasher H57
5 Direction mechanism assembly A 9
6 Ring O 8
7 Vertical support A 6
8 Connector P1
9 Spring O 20

Figure 12. Transmitter vertical support, exploded view.

28. Transmitter Friction Tests

Remove the screws (5, fig. 10) which fasten the transmitter to the connector-housing assembly (7). Lift the transmitter from the connector-housing assembly. Cover the top of the connector housing assembly with the cover provided (fig. 7). Take the transmitter to a sheltered area.

a. Generator Friction Test. Attach the 3.1-gram calibrator weight to the tip of one of the impeller blades with scotch tape. If the calibrator weight is not available, use a 1-cent coin. Turn the impeller until the weighted blade is approximately 45° from vertical and release the blade. The impeller should turn until the weighted blade is pointing downward. If this requirement is not met, check for friction between the impeller (4, fig. 10) and the shield (11). If no friction is present at this point, install a new generator.

b. Vane-Shaft Friction Test.

(1) *Preliminary check.* Place the transmitter on the edge of a bench or table. Position the transmitter to have the support assembly (24, fig. 10) resting on the edge of the bench or table and the vane hanging over the edge. Turn the vane until it is horizontal and release it. The vane will not rotate if it is in balance. If either the impeller end or the tail end of the vane moves downward, higher level maintenance is required. If the vane is in balance, make the friction test described below.

(2) *Friction test.* Attach the 12.3-gram calibrator weight to the trailing surface of the vane tail. Position the transmitter on a bench or table ((1) above), turn the vane until it is horizontal, and release the vane. The weight attached to the vane tail should cause the vane tail to move downward.

If it does not move downward, check for friction between the direction mechanism assembly (5, fig. 12) and the vertical support (7). If no friction is present at this point, higher level maintenance is required.

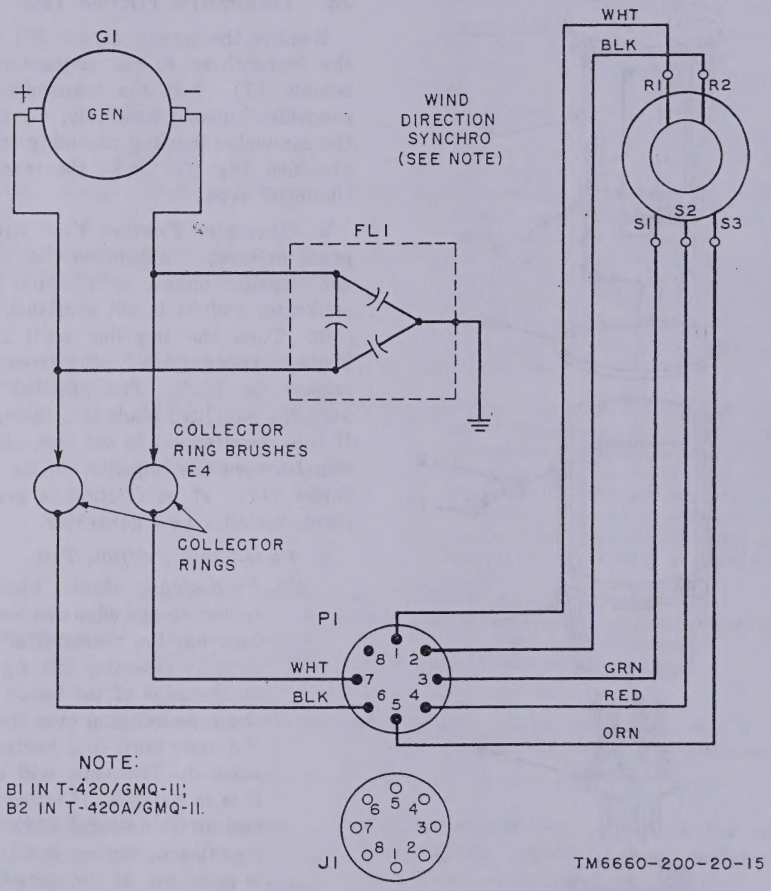


Figure 13. Transmitter, schematic diagram.

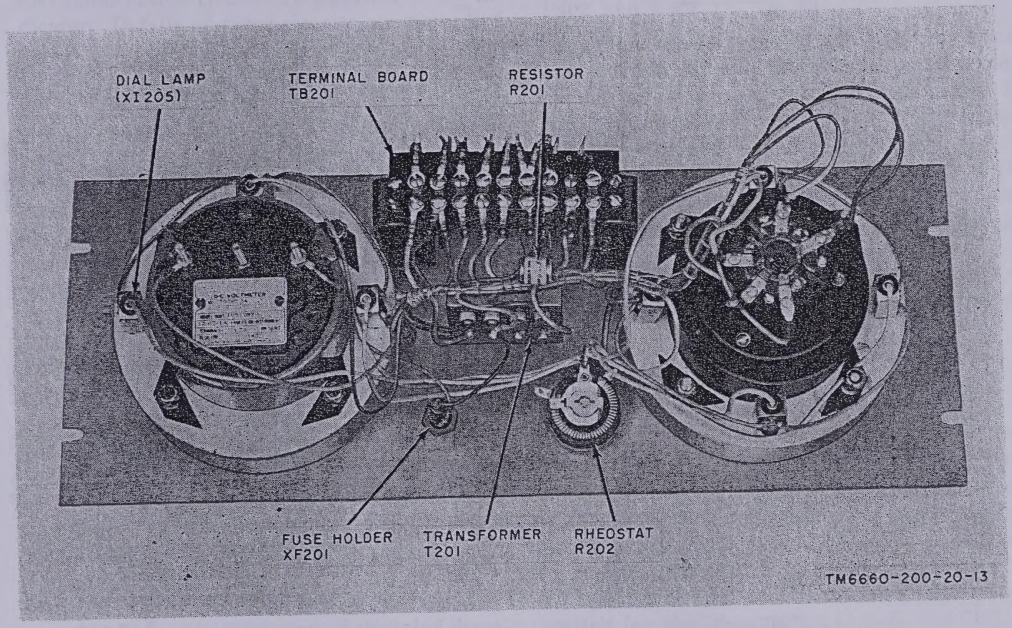
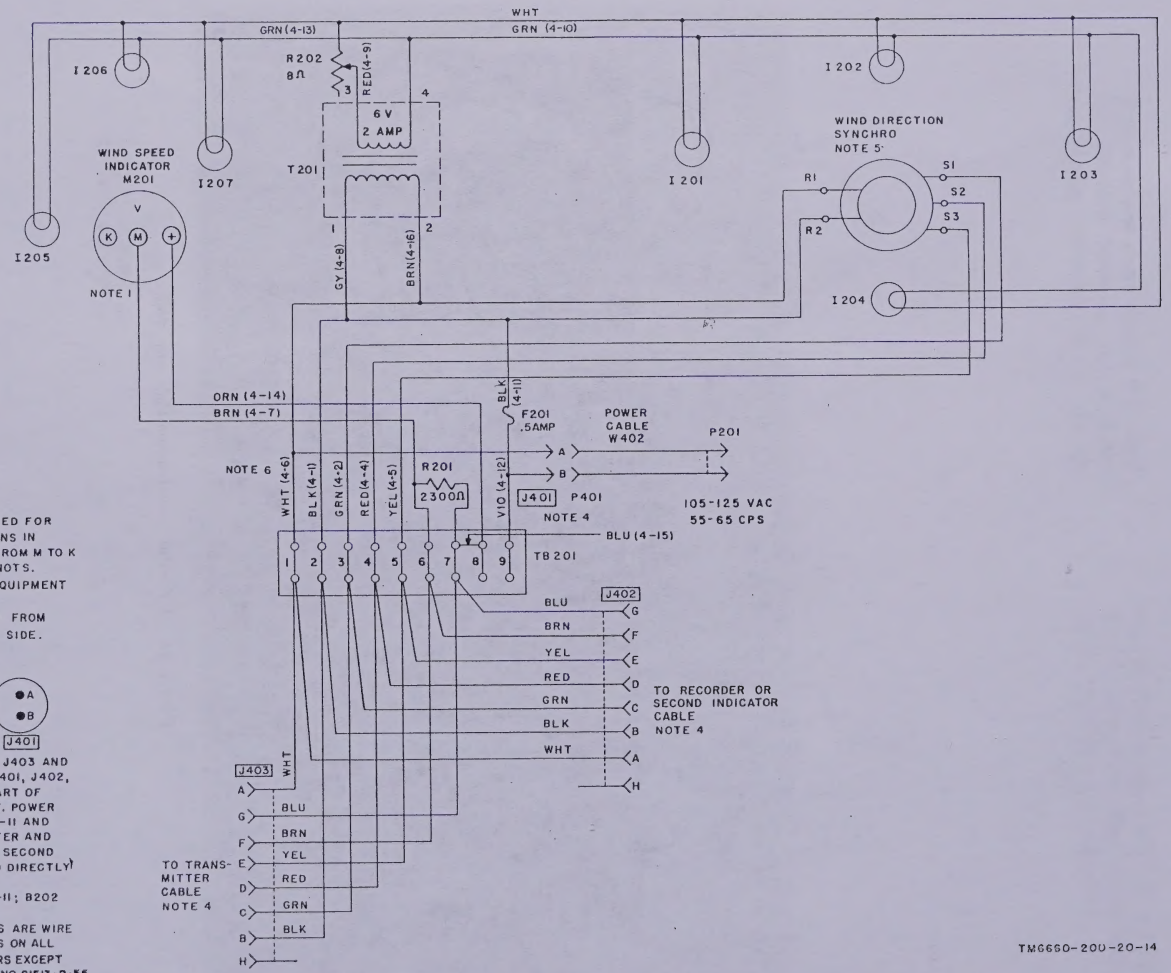
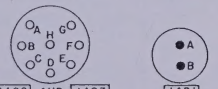


Figure 14. Indicator panel assembly, rear view.



NOTES:

1. M201 SHOWN CONNECTED FOR WIND SPEED INDICATIONS IN MPH. MOVE ORN WIRE FROM M TO K FOR INDICATIONS IN KNOTS.
2. [ ] INDICATES EQUIPMENT MARKING.
3. RECEPTACLES VIEWED FROM PIN OR RECEPTACLE SIDE.



J402 AND J403 J401

4. P401, J401, J402, AND J403 AND WIRING CONNECTING J401, J402, AND J403 TO TB201 PART OF ID-373A/GMQ-11 ONLY. POWER CABLE OF ID-373/GMQ-11 AND CABLES TO TRANSMITTER AND EITHER RECORDER OR SECOND INDICATOR CONNECTED DIRECTLY TO TB201.
5. B201 ON ID-373/GMQ-11; B202 ON ID-373A/GMQ-11.
6. NUMBERS IN PARENTHESES ARE WIRE IDENTIFICATION NUMBERS ON ALL ID-373/GMQ-11 INDICATORS EXCEPT THOSE BEARING ORDER NO. 21513-P-55.

TM6660-200-20-14

Figure 15. Indicator, schematic diagram.

CHAPTER 4
THEORY

29. General

The wind measuring set includes three circuits: the wind speed circuit, the wind direction circuit, and the dial illumination circuit. The wind speed and wind direction circuits include components mounted in the transmitter, components mounted in the indicator, and the interconnection cable. All components of the dial illumination circuit are mounted in the indicator. Details of these circuits are described below.

30. Wind Speed Circuit

a. The transmitter portion of the wind speed circuit includes generator G1 (figs. 10 and 13), collector rings and brushes, and terminals 6 and 7 of P1 and J1. The indicator portion of the wind speed circuit includes wind speed indicator M201 (fig. 15), resistor R201, and terminal board TB201. The wind speed circuit of the ID–373A/GMQ–11 also includes jacks J402 and J403 (fig. 8) and plugs P402 and P403. Resistor R201 is not utilized in the wind speed circuit when auxiliary equipment (recorder or additional indicator) is used.

b. Wind speed indicator M201 (a voltmeter), is controlled by the direct-current (dc) output of generator G1. The dial of M201 is calibrated in wind speed subdivisions and wind speed is read directly from the dial.

31. Wind Direction Circuit

a. The transmitter portion of the wind direction circuit includes a synchro (B1 in T–420/GMQ–11, B2 in T–420A/GMQ–11) and terminals 1 through 5 of P1 and J1 (fig. 13). The indicator portion of the wind direction circuit includes wind direction synchro (B201 in ID–373/GMQ–11, B202 in ID–373A/GMQ–11) and terminal board TB201 (fig. 15). The wind direction circuit of the ID–373A/GMQ–11 also includes jacks J402 and J403 and plugs P402 and P403 (B, fig. 9).

b. The rotor of the synchro in the transmitter is mechanically coupled to the vane, and as the vane turns in response to changes in wind direction, the synchro electrically transmits wind direction data to a similar synchro in the indicator. The synchro rotor in the indicator duplicates with little deviation, the movement of the synchro rotor in the transmitter. The pointer of the wind direction indicator is attached to the rotor of the indicator synchro and indicates the wind direction on the wind direction indicator dial.

32. Dial Illumination Circuit

The dial illumination circuit includes transformer T201, rheostat R202, lamp holders X1201 through X1207 and lamps I 201 through I 207, interconnected as shown in figure 15. The secondary of T201 steps the input voltage down to 6 volts. Rheostat R202 controls the intensity of dial illumination and is used also as an on-off switch for the illumination circuit.

CHAPTER 5
SHIPMENT AND LIMITED STORAGE

33. Disassembly

Prepare the wind measuring set for shipment or limited storage as described below.

a. Indicator.

(1) Disconnect the power cable from the power source. Disconnect P401 from J401 if the indicator is the ID–373A/GMQ–11.

(2) Disconnect the interconnection cable from the indicator. If the indicator is the ID–373A/GMQ–11, disconnect the plug from the interconnection cable.

b. Transmitter.

(1) Remove the transmitter from the connector housing (par. 28).

(2) Disconnect the interconnection cable from J1 in the connector housing (par. 10). Remove the connector housing from the support (par. 9).

(3) Remove the impeller from the transmitter (par. 11*a*).

[AG 413.6 (27 Jun 58)]

c. Support. Disassemble the support completely and place all hardware (screws, bolts, washers, etc.) in a cloth bag.

34. Repackaging for Shipment or Limited Storage

a. Repackage the transmitter, indicator, literature, tools, and running spares as illustrated in figure 1.

b. Repackage the support as illustrated in figure 2.

Note. Do not package the interconnection cable with the other items because it is not a component of the wind measuring set. Roll the interconnection cable into a coil and tie the free ends of the cable to the coil.

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

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USCONARC (5)
USA Arty Bd (1)
USA Armor Bd (Incl ea Test Sec) (1)
USA Inf Bd (1)
USA Air Def Bd (Incl ea Test Sec) (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA Arctic Test Bd (1)
US ARADCOM (Incl ea Rgn Comd) (2)
OS Maj Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Div (2)
Ft & Camps (2)
Svc College (5)
Br Svc Sch (5) except USASCS (25)
Gen Depot (2) except Atlanta Gen Depot (None)
Sig Sec, Gen Depot (10)
Sig Depot (17)
Port of Emb (OS) (2)
OS Sup Agcy (2)
Sig Fld Maint Shop (3)
Sig Lab (5)
USA Sig pub Agcy (8)
Army Pictorial Cen (2)
USASSA (Phila, Pa) (13)
Sp Wpn Comd (5)
White Sands Sig Agcy (13)
USA Elct PG (1)
Dugway PG (5)
Jefferson PG (5)
USA Com Agcy (2)
WRAMC (1)
USAMS (1)
Engr Maint Cen (1)
AFIP (1)
USA Sig Com Engr Agcy (1)
Mil Dist (1)
USA Corps (Res) (1)
Sectors, USA Corps (Res) (1)
JBUSMC (2)
Units org under the fol TOE:
1–207 (2)
3–266 (2)
11–7 (2)
11–16 (2)
11–18 (2)
11–57 (2)
11–127 (2)
11–128 (2)
11–500 (AA–AE) (2)
11–557 (2)
11–587 (2)
11–592 (2)
11–597 (2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

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